Amendments to the Claims

Please amend claims 1, 25 and 28. Please cancel claim 5. The currently pending claims after amendment are listed below.

1   1.   (Currently Amended)   A method of tracing the activity of an expression, said method
2   comprising the machine-implemented steps of:
3   (a)   receiving, from a user, a specification of a machine-implemented process in which a
4   trigger expression resulting in an L value during the machine-implemented process is
5   to be traced;
6   (b)   receiving, from a user, a specification of the trigger expression to be traced in the
7   machine-implemented process, said trigger expression representing a non-executable
8   data value having a state;
9   (c)   responsive to steps (a) and (b), monitoring execution of said machine-implemented
10   process without altering a logic flow of said machine-implemented process to detect
11   occurrences of a plurality of references to a location in machine memory representing
12   a state of said trigger expression, wherein each said occurrence of a reference to a
13   location in machine memory representing a state of said trigger expression occurs as a
14   result of executing said machine-implemented process;
15   (d)   responsive to each detected occurrence of a reference to said location in machine
16   memory representing a state of said trigger expression, storing the respective state of
17   the trigger expression at the time of the respective detected occurrence of a reference
18   to said location in machine memory representing a state of said trigger expression to
19   create a history of said trigger expression within the machine-implemented process,
20   said storing step being performed without interrupting the machine-implemented
21   process; and
22   (e)   restoring the state of the trigger expression when requested.

Docket No.:   CA920010004US1
Serial No.:   10/008,864

1   2.   (Original)   The method of claim 1, further comprising:

2   (a)   imposing a condition onto the trigger expression; and

3   (b)   storing the state of the trigger expression only when the condition is satisfied.

     3.   (Cancelled)

1   4.   (Previously Presented)   The method of claim 1, further comprising:

2   (a)   displaying the history such that the state of the trigger expression each time the trigger

3   expression was active can be displayed separately.

     5-6.   (Cancelled)

1   7.   (Previously Presented)   The method of claim 1, wherein the reference to said location in

2   machine memory representing a state of said trigger expression is a Read and/or a Write.

1   8.   (Previously Presented)   The method of claim 1, further comprising:

2   (a)   receiving, from a user, a specification of at least one attached expression;

3   (b)   responsive to each detected occurrence of a reference to said location in machine

4   memory representing a state of said trigger expression, storing the respective state of

5   the at least one attached expression at the time of the respective detected occurrence

6   of a reference to said location in machine memory representing a state of said trigger

7   expression, the states of the at least one attached expression being associated with

8   said history of said trigger expression within the machine-implemented process; and

9   (c)   restoring the state of the at least one attached expression when requested.

1   9.   (Original)   The method of claim 1, wherein the machine-implemented process is a

2   computer program.

Docket No.:   CA920010004US1
Serial No.:   10/008,864

1   10.   (Original)   The method of claim 1, as included in an object level trace program.

1   11.   (Original)   The method of claim 1, as included in a debug program.

1   12.   (Previously Presented) A method of tracing the activity of an expression in an executing

2   computer program, said method comprising the machine-implemented steps of:

3   (a)   receiving, from a user, a specification of the computer program in which a trigger

4   expression resulting in an L value during the execution of the computer program is to

5   be traced;

6   (b)   receiving, from a user a specification of the trigger expression and any optional

7   attachment expressions to be traced in the computer program, said trigger expression

8   representing a non-executable data value having a state;

9   (c)   imposing a condition onto the trigger expression;

10   (d)   responsive to steps (a) and (b), monitoring execution of said computer program to

11   detect occurrences of a plurality of accesses to a location in memory containing a

12   state representing said trigger expression, wherein each said occurrence of an access

13   to a location in memory containing a state representing said trigger expression occurs

14   as a result of executing said computer program;

15   (e)   responsive to each detected occurrence of an access to said location in memory

16   containing a value representing said trigger expression, if said condition is satisfied,

17   then storing the respective state of the trigger expression and any optional attachment

18   expressions at the time of the respective detected occurrence of an access to said

19   location in memory containing a state representing the trigger expression to create a

20   snapshot corresponding to the respective detected occurrence of an access to said

21   location in memory, the step of storing being accomplished without interrupting the

22   process;

23   (f)   creating a profile of the trigger expression comprising storing each snapshot;

24   (g)   displaying the profile such that each snapshot can be displayed separately; and

25   (h)   restoring the state of each snapshot, when requested.

13-24. (Cancelled)

Docket No.:   CA920010004US1
Serial No.:   10/008,864

1   25.   (Currently Amended)   An article of manufacture, comprising a data storage medium

2   tangibly embodying a program of machine readable instructions executable by an electronic

3   processing apparatus to perform method steps for operating an electronic processing apparatus,

4   said method steps comprising the steps of:

5   (a)   initiating a user interface to exchange data input/output with a user and an electronic

6   processing apparatus;

7   (b)   requesting and receiving a trigger expression from a user, said trigger expression

8   representing a non-executable data value having a state;

9   (c)   requesting and receiving a program identification of a program in which the trigger

10   expression is to be traced, <u>said trigger expression resulting in an L value during the</u>

11   <u>execution of said program</u>;

12   (d)   causing the electronic processing apparatus to execute the identified program;

13   (e)   monitoring execution of the identified program <u>without altering a logic flow of</u>

14   <u>execution of said program</u> to detect occurrences of a plurality of references to a

15   location in memory representing a state of said trigger expression, wherein each said

16   occurrence of a reference to a location in memory representing a state of said trigger

17   expression occurs as a result of executing the identified program;

18   (f)   responsive to each detected occurrence of a reference to said location in memory

19   representing a state of said trigger expression, storing the respective state of the

20   trigger expression at the time of the respective detected occurrence of a reference to

21   said location in memory representing a state of the trigger expression to create a

22   corresponding respective snapshot, said snapshots forming a history of said trigger

23   expression during execution of the identified program, said storing step being

24   performed   without interrupting or otherwise stopping execution of the identified

25   program;

26   (g)   maintaining the capability to restore each snapshot and display each snapshot to the

27   user.

Docket No.:   CA920010004US1
Serial No.:   10/008,864

1   26.   (Original)   The article of manufacture of claim 25, further comprising:

2   (a)   requesting the user to assign conditions to the trigger expression whereupon when the

3   conditions are satisfied, a snapshot of the trigger expression is stored.

1   27.   (Original)   The article of manufacture of claim 25, further comprising:

2   (a)   requesting the user to indicate attached expression whose states are also stored in a

3   corresponding snapshot whenever a snapshot is stored for the trigger expression.

1   28.   (Currently Amended)   A digital data processing device, comprising:

2   (a)   at least one processor;

3   (b)   a memory functionally connected to said at least one processor;

4   (c)   a first computer program executable by said at least one processor;

5   (d)   at least one input device receiving input from a user and at least one output device for

6   presenting output to a user;

7   (e)   a second computer program for tracing said first computer program, said second

8   computer program: (i) receiving a specification of a trigger expression <u>resulting in an</u>

9   <u>L value during execution of</u> ~~used by~~ said first computer program from said user using

10   said at least one input device, said trigger expression representing a non-executable

11   data value having a state; (ii) responsive to receiving a specification of a trigger

12   expression, monitoring execution of said first computer program to detect

13   occurrences of a plurality of references to a location in said memory representing a

14   value of said trigger expression, wherein each said occurrence of a reference to a

15   location in said memory representing a value of said trigger expression occurs as a

16   result of executing said first computer program; (iii) responsive to each detected

17   occurrence of a reference to said location in said memory representing a value of said

18   trigger expression, storing a corresponding snapshot containing state data of said first

19   computer program, said state data including said trigger expression, said storing step

20   being performed without interrupting said first computer program; (iv) creating a

21   history of said trigger expression during execution of said first program from said

22   snapshots; and (v) presenting said history to said user using said at least one output

23   device.

1   29.   (Previously Presented)   The digital data processing device of claim 28, wherein said

2   second computer program further receives a specification of at least one condition for capturing

3   said snapshot, and performs said step of storing a corresponding snapshot containing state data of

4   said first computer program only if said at least one condition is satisfied.

1   30.   (Previously Presented)   The digital data processing device of claim 28, wherein said

2   second computer program further received a specification of at least one attachment expression,

3   and responsive thereto, includes said at least one attachment expression in said state data.

1   31.   (Previously Presented)   The digital data processing device of claim 28, wherein the first

2   computer program and the second computer program execute on the same computer.

1   32.   (Previously Presented)   The digital data processing device of claim 28, wherein the first

2   computer program and the second computer program execute on separate units connected by a

3   data communications link.